

A REVISION OF THE NEARCTIC SPECIES OF *DICERURA* KIEFFER  
(DIPTERA: CECIDOMYIIDAE)

A. BORKENT

\* Biosystematics Research Centre, Agriculture Canada, Research Branch, Central Experimental Farm, Ottawa, Ontario, K1A 0C6, Canada.

---

*Abstract.*—This revision recognizes 8 species of *Dicerura* in the Nearctic Region including 6 as new. Descriptions are based on the male adults. A key is provided to all species.

*Key Words:* North America, Palaearctic

---

Species in the genus *Dicerura* Kieffer are relatively distinctive within the Cecidomyiidae. They are medium sized to relatively large and males can be recognized as members of the genus as alcohol or pinned specimens through examination of their wings, antennal flagellomere numbers and their modified genitalia.

Overall, the Cecidomyiidae are one of the most poorly taxonomically understood groups of Diptera (Vockeroth 1979). This is reflected in the present revision, where only two species of *Dicerura* have been previously named in North America (one in another genus) and an additional 6 species are recognized on the basis of only 14 specimens.

The species in the Palaearctic are better known. Mamaev (1960, 1964, 1966, 1968, 1972, 1975) has described a number of species in the USSR. The species occurring in Latvia, which includes many of those more broadly distributed in the Palaearctic region, have been recently revised by Spungis (1987).

---

MATERIALS AND METHODS

This study was based on the examination of 81 males of *Dicerura*, housed in either the CNCI or USNM. Requests for additional material resulted in only negative responses. Cecidomyiidae are not well represented in most North American collections!

The acronyms used to represent the museums from which material was studied are those provided by Arnett and Samuelson (1986):

CNCI—Canadian National Collection of Insects, Biosystematics Research Centre, Agriculture Canada, Ottawa, Ontario, K1A 0C6, Canada.

NYSM—New York State Museum, Biological Survey, 3132 Cultural Education Center, Albany, New York, 12230, USA.

USNM—United States National Entomological Collection, Dept. of Entomology, U.S. National Museum of Natural History, Washington, DC., 20560, USA.

The few specimens studied for this revision were collected either by sweeping, with malaise traps or with a light trap.

---

\* Current address: 2330—70th St. SE, Salmon Arm, British Columbia, V1E 4M3, Canada.

Of the Palaearctic species, I have been able to examine material of only *D. iridis* and *D. rossica*. Otherwise, the Nearctic material described in this paper was compared only to literature descriptions.

Adults were preserved in 70% ethanol and were mounted on microscope slides using a method developed by Leo Forster of our centre. Adults had their wings removed and placed in 15% acetic acid. The head and abdomen were dissected from the thorax and all were placed in 10% KOH which was then heated in a hot water bath. When fully cleared these were placed with the wings in the acetic acid. All parts were then placed through successive baths of 100% 2-propanol, 2-propanol layered over clove oil, pure clove oil, where the antennae and left legs were further separated from the head and thorax respectively, and finally into Canada Balsam on the slide. The antennae and legs were sometimes removed while the specimen was in the Canada Balsam.

Structures were measured using a micrometer in a Nikon compound microscope.

I used the terms provided by Gagné (1981) for discussing various characters.

Type specimens in the Canadian National Collection are given numbers in a reference text and these numbers are reported here with the description of the type locality of each named species as 'CNC No.' Some locality labels are accompanied by a 'CD' number. These refer to detailed notes for a given locality housed in the Diptera Unit of the Biosystematic Research Centre.

Because of a lack of phylogenetic resolution, the species are arranged alphabetically in the text.

### *Dicerura* Kieffer

*Dicerura* Kieffer 1898: 57. Type-species *Dicerura scirpicola* Kieffer (by monotypy).  
*Iridomyza* Rübsaamen 1899: 67. Type-species *Iridomyza kaltenbachii* Rübsaamen (= *Dicerura iridis* (Kaltenbach)) (by monotypy).

*Hormosomyia* Felt 1919: 220. Type-species *Hormosomyia oregonensis* Felt (by original designation).

*Ulmomyia* Mamaev 1960: 1521. Type-species *Ulmomyia rossica* Mamaev (by original designation).

*Neosynepidosis* Parnell 1971: 313. Type-species *Neosynepidosis furcata* (Felt) (by original designation). **NEW SYNONYM.**

**Diagnosis.**—*Males*: only Holarctic Cecidomyiidae with the following combination of character states: 14 antennal flagellomeres; first tarsomere of each leg shorter than second;  $M_3$  present (in some barely discernable);  $CuA_1$  absent; parameres fused; gonostylus lacking tooth or dense apical brush.

**Description.**—*Male*: coloration: head, thorax, legs, abdomen light to dark brown, thorax with vittae evident; wings pale to generally infuscated.

*Head*: eye bridge either present or absent (with a gap equal to 2–3 ommatidia); antenna with 14 flagellomeres; flagellomeres with well developed node and neck, each with basal encircling circumfila, with one or two extensions distally; palpus with 4–5 segments.

*Thorax*: with dorsal outline of scutum and scutellum in lateral view forming an uninterrupted curve; dorsocentral, acrostichal, anepisternal setae present; anepimeral, kat-episternal setae present or absent.

*Wing*: with macrotrichia on membrane and veins;  $R_s$  lying in similar direction as  $R_{4+5}$ ;  $R_{4+5}$  extending past apex of wing; apex of  $M_{1+2}$  present or absent; apical portion of  $M_3$  present or absent;  $CuA_1$  absent;  $CuA_2$  present.

*Legs*: first tarsomere of each leg with apical projection; claws with 2–4 ventral teeth; empodium about  $\frac{1}{3}$ – $\frac{1}{2}$  length of claw.

*Abdomen*: posterior setae on tergites arranged in continuous transverse row or in two lateral groups.

*Genitalia*: tergite 9 densely pruinose; cerci present on hypoproct; parameres fused, forming an aedeagal guide posterodorsally,

Table 1. List of species now placed in the genus *Dicerura*.

---

<i>adunca</i> n. sp. Borkent. Ontario, Canada.
<i> barbata</i> Mamaev 1966: 226. Ukrainian SSR.
<i> carpiensis</i> n. sp. Borkent. Ontario, Canada.
<i> cooperi</i> n. sp. Borkent. Newfoundland, Canada.
<i> complicata</i> Spungis 1987: 27. Latvia.
<i> curva</i> n. sp. Borkent. Ontario, Canada.
<i> dentata</i> Spungis 1979: 84. Latvia.
<i> elongata</i> n. sp. Borkent. Arizona, USA.
<i> foliicola</i> Mamaev 1968: 614. Maritime Territory, USSR.
<i> fungicola</i> (Mamaev) 1964: 904 ( <i>Ulmomyia</i> ). Moscow Region, USSR.
<i> furcata</i> (Felt) 1907: 52 ( <i>Winnertzia</i> ). New York, USA.
NEW COMBINATION.
<i> furculata</i> Mamaev 1968: 614. Ukrainian SSR.
<i> iridis</i> (Kaltenbach) 1874: 717 ( <i>Cecidomyia</i> ). Germany.
<i> kaltenbachi</i> (Rübsaamen) 1899: 67 ( <i>Iridomyza</i> ). Germany.
<i> loba</i> n. sp. Borkent. Ontario, Canada.
<i> mixta</i> Spungis 1987: 24. Latvia.
<i> oregonensis</i> (Felt) 1919: 220 ( <i>Hormosomyia</i> ). Oregon, USA.
<i> padt</i> Mamaev 1975: 60. Maritime Territory, USSR.
<i> rossica</i> (Mamaev) 1960: 1521 ( <i>Ulmomyia</i> ). Voronezh region, USSR.
<i> scirpicola</i> Kieffer 1898: 57. Europe.
<i> scirpi</i> Kieffer 1899: 165 (new name for <i>scirpicola</i> ).
<i> separata</i> Spungis 1987: 26. Latvia.
<i> stipator</i> Mamaev 1972: 113. Maritime Territory, USSR.
<i> triangularis</i> Mamaev 1966: 227. Ukrainian SSR.
<i> unidentata</i> Spungis 1987: 20. Latvia.
<i> xylophila</i> Mamaev 1966: 227. Ukrainian SSR.

---

with posterolateral barbs present or absent; aedeagus elongate, single or bifid posteriorly; gonocoxite with mediobasal, pruinose lobe; gonostylus lacking tooth, with or without developed mediobasal lobes.

Distribution and bionomics.—The genus is presently known only from the Holarctic Region. Biological information is available for only some of the Palaearctic species where larvae have been collected from the leaf axils of various plants such as *Scirpus sylvaticus*, *Iris pseudacorus*, and *Acorus calamus*, from rotting wood, from decaying leaves, or from soil (Mamaev 1973, Spungis 1987).

Taxonomic discussion.—All the species that are presently included in *Dicerura* are listed in Table 1. *D. indica* Grover has been recently transferred to *Cryptoneurus* by Grover (1981).

I consider the genus *Neosynepidosis* as a synonym of *Dicerura* because of the fundamental similarity between the species of the two genera. The characters previously considered to distinguish *Neosynepidosis* are now known within *Dicerura*: the presence of circumfila with distal extensions and the presence of an unforked aedeagus.

The only other genus in the Dicerurini in which males are reported to lack a tooth on the gonostylus is in the monotypic genus *Synepidosis* Mamaev (Mamaev 1964). However, Dr. V. Spungis (pers. comm.) has examined the type of *S. longiventris* Mamaev (from Voronezh Province, USSR) and reports that the gonostylus does in fact bear a small tooth.

Mamaev (1966) reported in a generic diagnosis that some *Dicerura* lack teeth on their tarsal claws. Examination of material and literature descriptions show or report that all *Dicerura* possess at least one tooth on their claws. However, one specimen of *D. oregonensis* had the teeth broken off one midleg claw, indicating that this condition may be an artifact of age or preparation.

Female *Dicerura* have been previously described only from several Palaearctic species (Kieffer 1899, Mamaev 1960, 1964, 1966, 1968, Panellius 1965, Spungis 1987). Although I collected several female *Dicerura* in the Nearctic, I was unable to confidently associate these with males, which appear to be more easily differentiated from one another than are females. I was therefore unable to include descriptions of identified females in this paper. Furthermore, the morphological variation of these and previously described Palaearctic females, in combination with our generally poor understanding of the females of Cecidomyiidae, does not allow for a generic diagnosis of the females at this time. Similarly, the

larvae of some Palaearctic species have been described (Kaltenbach 1874, Mamaev and Krivosheina 1965, Rbsaamen 1899, Spungis 1979, 1987) but they too, for the same reasons as for the females, cannot be diagnosed generically.

Panelius (1965) provided a cladistic analysis of the generic relationships within the Porricondylinae. His major groupings indicated that the subfamily is paraphyletic. No synapomorphy was proposed for *Dicerura* and the monophyly of the genus is therefore uncertain. The only character state which may argue for recognition of this clade is the lack of a tooth on the gonostylus of the male. However, outgroup comparisons within the Lestremiinae and Cecidomyiinae indicate that both toothed and bare gonostylii are present. In addition, the bare gonostylus of *Dicerura* is not unique within the Porricondylinae (e.g. present in some *Winternertzini*, some *Porricondyla*), indicating that the character is susceptible to homoplasy. Consequently, the genus may not be monophyletic. Nevertheless, there is a general similarity of appearance of members of the group and they are presented as a single genus in this paper.

#### KEY

Members of the genus *Dicerura* may be recognized as such in the Holarctic Region using Gagn (1981), with the consideration that *Neosynepidosis* is considered a synonym of *Dicerura* here.

The outline of the gonostylus can be markedly affected by differences in position. Care must be taken, therefore, in comparing specimens to the illustrations provided here.

#### KEY TO ADULT MALES OF NEARCTIC *DICERURA* SPECIES

1. Gonostylus with markedly developed medio-basal lobe (Figs. 3A, B, D, 4C) . . . . . 2
- Gonostylus with no or only slightly developed medio-basal lobe (Figs. 3C, 4A, B, D) . . . . . 5
2. Gonostylus with portion distal to medio-basal lobes elongate, apex abruptly bent ventrally (Fig.

- 3D); parameres lacking posterolateral barbs . . . . . *curva* n. sp.
- Gonostylus with portion distal to medio-basal lobes relatively short and apex, at most, somewhat bent medially (Figs. 3A, B, 4C); parameres with posterolateral, stout barbs . . . . . 3
3. Medio-basal lobe pointed distally (Fig. 3A); aedeagus with a single apex and an associated sclerite; tergite 9 markedly bilobed . . . . . *adunca* n. sp.
- Medio-basal lobe rounded distally (Figs. 3B, 4C); aedeagus biramous apically, lacking associated sclerite; tergite 9 truncated or slightly bilobed . . . . . 4
4. Apex of aedeagus with divergent and separate ends (Fig. 3B); parameres parallel sided posteriorly; flagellomere 3 with stem 0.50–0.67 times length of basal node (Fig. 1B) . . . . . *carpiensis* n. sp.
- Apex of aedeagus with ends closely appressed (Fig. 4C); parameres somewhat bulbous posteriorly; flagellomere 3 with stem 0.94 times length of basal node (Fig. 1G) . . . . . *loba* n. sp.
5. Aedeagus with single apex (Fig. 4B); paramere lacking posterolateral barbs; flagellomere 3 with stem 0.58–0.86 times length of basal node (Fig. 1F) . . . . . *furcata* (Felt)
- Aedeagus with biramous apex (Figs. 3C, 4A, D); paramere with posterolateral barbs; flagellomere 3 with stem at least 1.00 times length of basal node (Fig. 1C, E, H) . . . . . 6
6. Tergite 9 truncated posteriorly (Fig. 4A); aedeagus with ends of biramous apex closely appressed for most of length; gonostylus elongate and of nearly equal diameter; flagellomere 3 with stem 1.06 times length of basal node (Fig. 1E) . . . . . *elongata* n. sp.
- Tergite 9 rounded or bilobed apically (Fig. 3C, 4D); aedeagus with ends of biramous apex divergent and distinctly separated; gonostylus tapering to apex; flagellomere 3 with stem more than 1.41 times length of basal node (Fig. 1C, H) . . . . . 7
7. Parameres forming rounded lobe posteriorly, with apex with bilobed nipple (Fig. 3C); gonostylus thick, squat for most of its length . . . . . *cooperi* n. sp.
- Parameres forming triangular lobe posteriorly, with apex with single nipple (Fig. 4D); gonostylus evenly tapered posteriorly . . . . . *oregonensis* (Felt)

#### *Dicerura adunca* Borkent, NEW SPECIES

Types.—Holotype, male adult on microscope slide, labelled "Holotype *Dicerura*

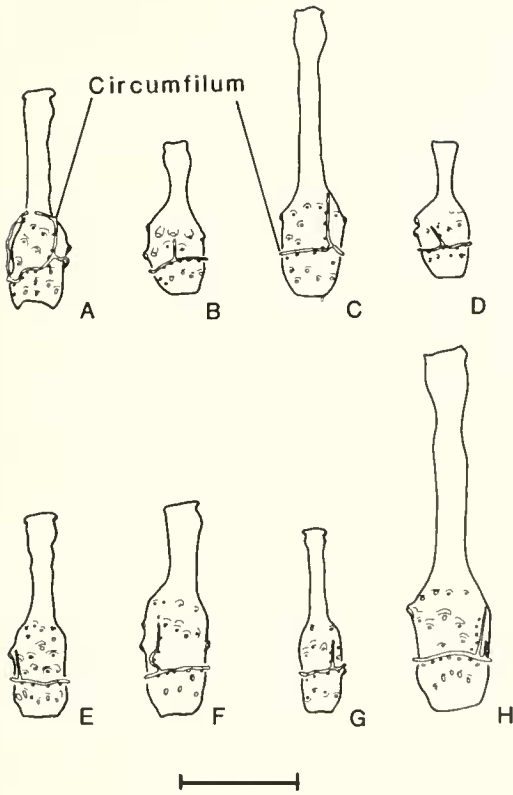


Fig. 1. Third flagellomere of male antenna. Setae and spicules not drawn. Scale = 0.1 mm. A, *D. adunca*. B, *D. carpiensis*. C, *D. cooperi*. D, *D. curva*. E, *D. elongata*. F, *D. furcata*. G, *D. loba*. H, *D. oregonensis*.

*adunca* Borkent, ♂, Ancaster Spring, Valley, Cons. Area, Wentworth Co., Ont., 6-7-VI-1984, I. M. Smith, CD207, CNC NO. 20343" (CNCI); paratype: 1 male labelled as for holotype (CNCI).

**Diagnosis.**—*Male*: only Nearctic species in which the circumfilum has two extensions reaching to the distal margin of the flagellomere node; otherwise, this is the only species in which the mediobasal lobe of the gonostylus is short and hooked.

**Description of male adult.**—*Head*: dorsal eye bridge lacking 1-2 ommatidia medially; antennal length/wing length = 0.90; antennal flagellomere 3 with stem 1.00-1.39 length of basal node (Fig. 1A), circumfilum a basal ring with two extensions reaching to

distal margin of node; palpus with 5 segments.

*Wing*: length = 2.5 mm;  $M_{1+2}$  absent,  $M_3$  present apically; halter with moderately elongate stem (Fig. 2A).

**Genitalia** (Fig. 3A): tergite 9 narrowed posteriorly, bilobed; gonocoxites with slight bilobed posteromedial projection; gonostylus with anteroventral dense patch of short setae, with short, hooked, densely setose mediobasal lobe, gonostylus of similar diameter to rounded apex; paramere forming elongate, somewhat parallel sided projection posteriorly, with very rounded apex, posterolateral margins with double row of short, stout barbs; aedeagus undivided at midlength, with single pointed apex, with subapical barbs, associated oval sclerite.

**Taxonomic discussion.**—Aside from the characters noted in the diagnosis, this species is unique in the presence of a separate sclerite associated with aedeagus.

**Derivation of specific epithet.**—The name *adunca* (bent inward) refers to the shape of the mediobasal lobe on the gonostylus.

### *Dicerura carpiensis* Borkent,

#### NEW SPECIES

**Types.**—Holotype, male adult on microscope slide, labelled "Holotype *Dicerura carpiensis* Borkent, ♂, 3 km E. Carp, Ont., 19-V-3-VI-1983, A. Borkent, CD42, Malaise trap, CNC No. 20344" (CNCI); paratypes: 1 male labelled as for holotype; 1 male from km 75-125, Dempster Hwy, Yukon Territory (19-VI-1984, S. & J. Peck) (CNCI); 1 male from Springwater Cons. area, nr. Alymer, Ont. (27-VI-11-VII-1984, K. Ferguson) (CNCI); 1 male from Motts Creek, Atlantic Co., New Jersey (21-V-?, R. J. Gagné).

**Diagnosis.**—*Male*: only Nearctic species with a gonostylus with an apically rounded mediobasal lobe and with a relatively short stem on the flagellomeres (flagellomere 3 with stem 0.50-0.67 times length of basal node).

**Description of male adult.**—*Head*: dorsal

eye bridge 3–4 ommatidia wide; antennal length/wing length = 0.64–0.69; antennal flagellomere 3 with stem 0.50–0.67 length of basal node (Fig. 1B), circumfilum a basal ring with a single distal extension; palpus with 5 segments.

*Wing*: length = 2.35–2.81 mm;  $M_{1+2}$  absent,  $M_3$  present apically; halter with moderately elongate stem (Fig. 2B).

*Genitalia* (Fig. 3B): tergite 9 somewhat truncated to rounded posteriorly; gonocoxites with single, posteromedial concavity with small, medial, posteriorly directed lobe, bordered laterally by slightly developed lobes; gonostylus with anteroventral dense patch of short setae, with well developed, densely setose mediobasal lobe, gonostylus distal to mediobasal lobe gradually tapering; paramere forming elongate, somewhat parallel-sided projection posteriorly, with apex bilobed, posterolateral margins with short, stout barbs; aedeagus undivided at midlength, biramous for apical quarter, with ends distinctly separate for their entire length, lacking spicules.

*Taxonomic discussion*.—All specimens were collected with malaise traps except for the male from the Yukon Territory which was collected with a car net (net mounted on a vehicle).

*Derivation of specific epithet*.—The name *carpiensis* refers to the type locality, near Carp, Ontario, where the author resided for several years.

#### *Dicerura cooperi* Borkent, NEW SPECIES

*Type*.—Holotype, male adult on microscope slide, labelled "Holotype *Dicerura cooperi* Borkent, ♂, CNC No. 20345, 3 km. N. Picadilly, Nfld. [Newfoundland], 25-VI-83, A. Borkent, CD71, Sweeping grass" (CNCI).

*Diagnosis*.—*Male*: only Nearctic species with parameres forming rounded lobe posteriorly, with its very apex bearing a bilobed nipple and with a thick, squat gonostylus bearing a short mediobasal lobe.

*Description of male adult*.—*Head*: dorsal

eye bridge 2 ommatidia wide; antennal length/wing length unknown (terminal flagellomeres missing); antennal flagellomere 3 with stem 1.76 length of basal node (Fig. 1C), circumfilum a basal ring with a single distal extension; palpus with 5 segments.

*Wing*: length = 2.77 mm;  $M_{1+2}$  absent,  $M_3$  present apically; halter with elongate stem (Fig. 2C).

*Genitalia* (Fig. 3C): tergite 9 slightly bilobed posteriorly; gonocoxites with single, medially convex posteromedial concavity, bordered laterally by slightly developed lobes; gonostylus with anteroventral dense patch of short setae, with short, densely setose mediobasal lobe, gonostylus tapering gradually to apex, small apical projection slightly bent medially; paramere forming wide, somewhat rounded projection posteriorly, very apex with bilobed nipple, posterolateral margins with short, stout barbs; aedeagus undivided at midlength, biramous for apical half with ends distinctly separate and ridged, lacking spicules.

*Taxonomic discussion*.—*D. cooperi* is somewhat similar to the Palearctic *D. dentata*. However, *D. dentata* differs in having the apex of the parameres entirely rounded while in *D. cooperi* the parameres have an apical, bilobed nipple. In addition, the aedeagus of *D. dentata* is straight apically but this may be an artificial difference due to position.

*Derivation of specific epithet*.—The name *cooperi* is given in recognition of Mr. Bruce E. Cooper. A number of specimens he collected were important to this study and reflect his major contributions to the growth, health and welfare of the Diptera collection housed in the Canadian National Collection.

#### *Dicerura curva* Borkent, NEW SPECIES

*Types*.—Holotype, male adult on microscope slide, labelled "Holotype *Dicerura curva* Borkent, ♂, Springwater Cons. area, nr. Alymer, Ont., 27-VI–11-VII-1984, K. Ferguson, CD 253, CNC No. 20346"

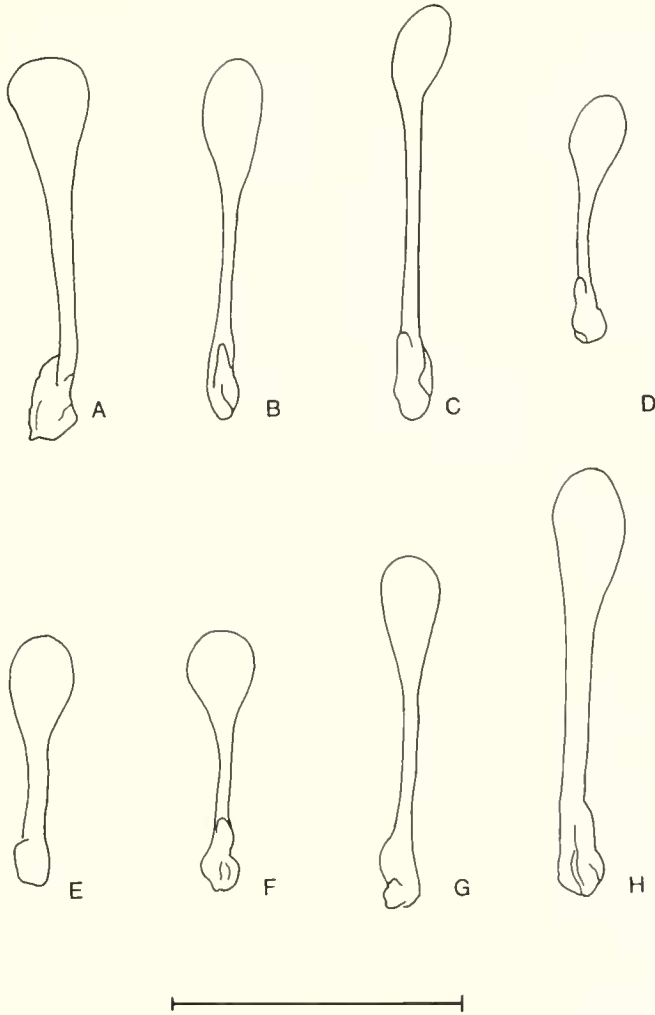


Fig. 2. Outline of male halter. Scale = 0.5 mm A, *D. adunca*. B, *D. carpiensis*. C, *D. cooperi*. D, *D. curva*. E, *D. clongata*. F, *D. furcata*. G, *D. loba*. H, *D. oregonensis*.

(CNCI); paratypes: 1 male from 4 km NW Kagawong, Manitoulin Is., Ontario, 1-16-VI-1982, A. Ritchie (CNCI); 1 male from Cheticamp, Nova Scotia, 6-VI-1984, B. E. Cooper (CNCI).

Diagnosis.—*Male*: only Nearctic species with a gonostylus with a well developed mediobasal lobe and an apex which is bent ventrally.

Description of male adult.—*Head*: dorsal eye bridge 3-6 ommatidia wide; antennal length/wing length = 0.62-0.67; antennal

flagellomere 3 with stem 0.76-0.88 length of basal node (Fig. 1D), circumfilum a basal ring with a single distal extension; palpus with 5 segments.

*Wing*: length = 1.9-2.4 mm;  $M_{1+2}$  absent,  $M_3$  barely discernible apically; halter with relatively short stem (Fig. 2D).

*Genitalia* (Fig. 3D): tergite 9 somewhat truncated to rounded posteriorly; gonocoxites with single, posteromedial concavity with small, medial, posteriorly directed lobe, bordered laterally by slightly developed

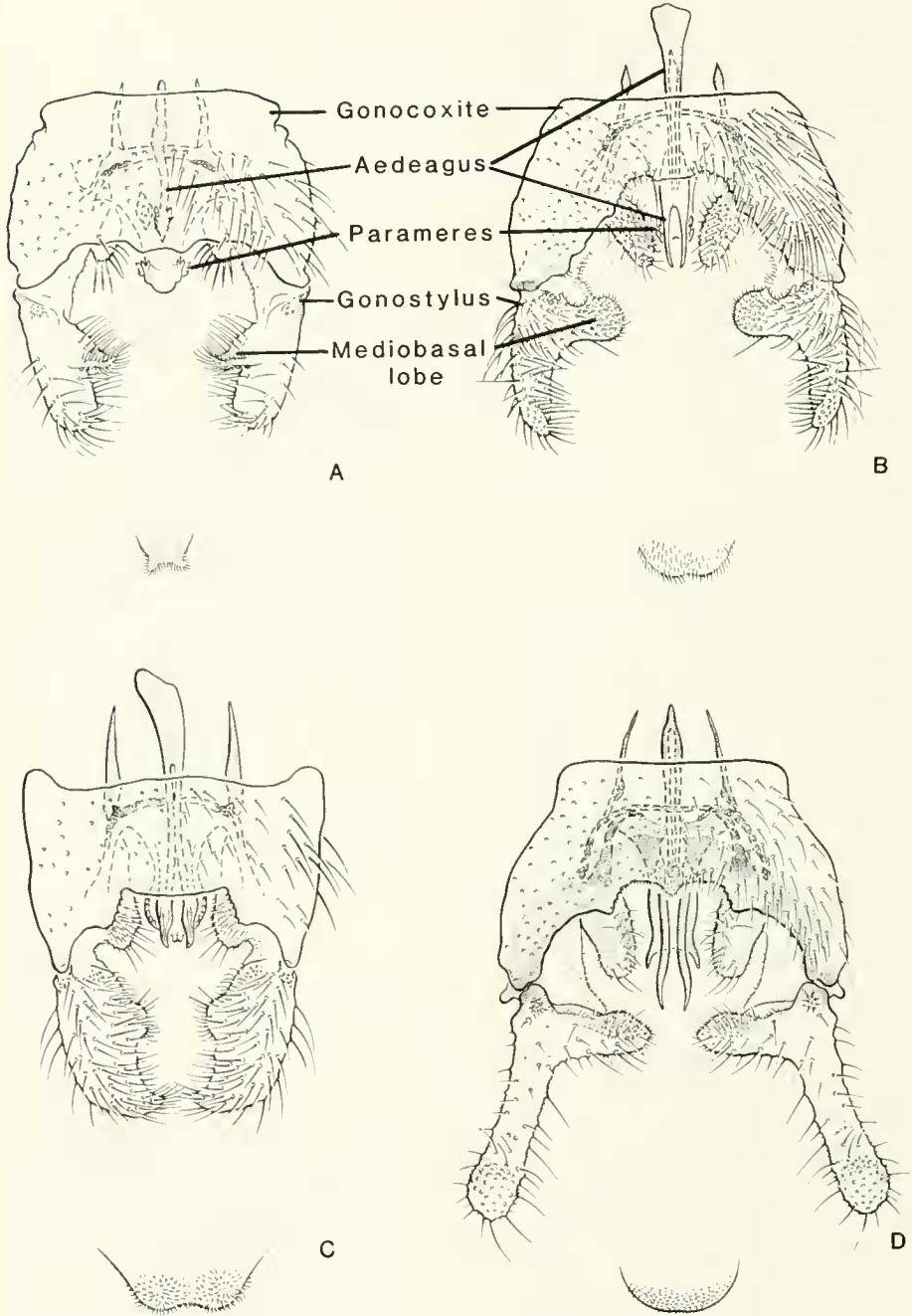


Fig. 3. Male genitalia in ventral view; apex of tergite 9 drawn below. A, *D. adunca*. B, *D. carpiensis*. C, *D. cooperi*. D, *D. curva*.



lobes; gonostylus with anteroventral dense patch of short setae, with well developed, densely setose mediobasal lobe, gonostylus distal to mediobasal lobe of equal diameter, with very apex abruptly directed ventrally; paramere forming elongate, somewhat parallel-sided projection posteriorly, with apex bilobed, posterolateral margins lacking barbs; aedeagus undivided at midlength, biramous for apical half, with ends distinctly separate for their entire length, lacking spicules.

Taxonomic discussion.—This species is very similar to the Palearctic *D. separata* but tergite 9 is not so tapered apically, the parameres have posteriorly directed barbs apically, and the mediobasal lobe of the gonostylus is proportionally larger. If further collection supports the view that these two are separate species, they are probably sister species, based on the shared unique conformation of the apex of the gonostylus.

The two specimens from Ontario were collected with a Malaise trap.

Derivation of specific epithet.—The name *curva* refers to the unusual subapical curve in the gonostylus of the male of this species (shared by *D. separata* in the Palearctic).

#### *Dicerura elongata* Borkent, NEW SPECIES

Type.—Holotype, male adult on microscope slide, labelled "Holotype *Dicerura elongata* Borkent, ♂, USNM, Portal, Cochise Co., Ariz., VIII-1-67, at light, Saul and Suzy Frommer, Can. Balsam" (USNM).

Diagnosis.—*Male*: only Nearctic species with a markedly elongate gonostylus, of nearly constant diameter, and lacking a well defined mediobasal lobe.

Description of male adult.—*Head*: dorsal eye bridge 6 ommatidia wide; antennal length/wing length = 0.91; antennal flagellomere 3 with stem 1.06 length of basal node (Fig. 1E), circumfilum a basal ring with a single distal extension; palpus with 5 segments.

*Wing*: length = 2.39 mm;  $M_{1+2}$  present

apically,  $M_3$  present apically; halter with short stem (Fig. 2E).

*Genitalia* (Fig. 4A): tergite 9 truncate with posterolateral corner with lobe; gonocoxites with posteromedial concavity with medial spiculate lobe, bordered laterally by fleshy lobes; gonostylus with anteroventral dense patch of short setae, lacking mediobasal lobe (patch of spicules present), gonostylus of nearly constant diameter to rounded apex; paramere forming expanded projection posteriorly, truncated apically, posterolateral margins with short, stout barbs; aedeagus divided at midlength, biramous apically with ends closely appressed, lacking spicules.

Derivation of specific epithet.—The name *elongata* refers to the distinctive, elongate gonostylus of the male of this species.

#### *Dicerura furcata* (Felt), NEW COMBINATION

*Winnertzia furcata* Felt 1907: 148. Holotype, male adult on microscope slide, not seen (housed in USNM on long term loan from NYSM). Type locality, Nassau, New York.

*Asynapta furcata*: Felt 1908: 420.

*Neosynepidosis furcata*: Parnell 1971: 313.

Diagnosis.—*Male*: only Nearctic species with a gonostylus lacking a mediobasal lobe and with the aedeagus undivided.

Description of male adult.—*Head*: dorsal eye bridge 6–8 ommatidia wide; antennal length/wing length = 0.83–0.86; antennal flagellomere 3 with stem 0.58–0.86 length of basal node (Fig. 1F), circumfilum a basal ring with a single distal extension; palpus with 5 segments.

*Wing*: length = 2.6–3.3 mm;  $M_{1+2}$  present apically,  $M_3$  present apically; halter with relatively short stem (Fig. 2F).

*Genitalia* (Fig. 4B): tergite 9 broad, slightly bilobed; gonocoxites with single, evenly curved posteromedial concavity bordered laterally by fleshy lobes, gonostylus with anteromedial dense patch of short setae, lacking mediobasal lobe, gonostylus broadly bent

at midlength; paramere forming parallel sided projection posteriorly, posterolateral margins lacking barbs but forming convoluted thick cuticle; aedeagus divided at midlength, biramous apically with ends closely appressed, lacking spicules.

Taxonomic discussion.—The justification for considering this species, previously placed in *Neosynepidosia*, as a member of *Dicerura* is noted above in the taxonomic discussion of the genus.

Material examined.—I have examined 54 males from the following localities: 14 mi. (22 km) E. Dawson, Y.T.; 40 km. E. Dawson, Y.T.; Kemptville, Ontario; 4 km N. Metcalf, Ontario; 3 km SW Richmond, Ontario; Dunbar Lk., St. Maurice Provincial Park, Quebec; 19 km N. Grand-Mere, Quebec. Specimens were collected from May 31 to August 22.

#### *Dicerura loba* Borkent, NEW SPECIES

Types.—Holotype, male adult on microscope slide, labelled "Holotype *Dicerura loba* Borkent, ♂, 3 km E. Carp, Ont., 21-V-11-VI-1984, A. Borkent, CD251, CNC No. 20347" (CNCI); paratype: 1 male labelled as for holotype (CNCI).

Diagnosis.—*Male*: only Nearctic species with the apex of the aedeagus with ends closely appressed, the parameres somewhat bulbous posteriorly and flagellomere 3 with its stem 0.94 times length of the basal node.

Description of male adult.—*Head*: dorsal eye bridge without ommatidia medially; antennal length/wing length = 0.89; antennal flagellomere 3 with stem 0.94 length of basal node (Fig. 1G), circumfilum a basal ring with a single distal extension; palpus with 5 segments.

*Wing*: length = 2.12–2.55 mm;  $M_{1+2}$  barely discernable or absent,  $M_3$  present apically; halter with moderately elongate stem (Fig. 2G).

*Genitalia* (Fig. 4C): tergite 9 slightly bilobed; gonocoxites with single, evenly curved posteromedial concavity bordered

laterally by moderately developed lobes; gonostylus with anteroventral dense patch of short setae, with well developed, densely setose mediobasal lobe, gonostylus tapering gradually to rounded apex; paramere forming wide projection posteriorly, posterolateral margins with short, stout barbs; aedeagus undivided at midlength, thicker for apical third, biramous apically with ends closely appressed for basal portion, distinctly separate at very apex, lacking spicules.

Derivation of specific epithet.—The name *loba* refers to the shape of the mediobasal lobe on the gonostylus of this species.

#### *Dicerura oregonensis* (Felt)

*Hormosomyia oregonensis* Felt 1919: 220.

Holotype, male adult on microscope slide, labelled "Type n.g. s.sp. Entomologic Division *Hormosomyia oregonensis* (sic) F.R. Cole. 4 Felt. Forest Grove, Ore., C1790, N.Y. State Museum, 13 Mar. 1919" (housed in USNM on long term loan from NYSM).

*Dicerura oregonensis*: Mamaev 1966: 226; Parnell 1971: 308.

Diagnosis.—*Male*: only Nearctic species with a gonostylus which tapers gradually to its apex, with a poorly defined mediobasal lobe.

Description of male adult.—*Head*: dorsal eye bridge 3–8 ommatidia wide; antennal length/wing length = 1.06–1.14; antennal flagellomere 3 with stem 1.41–1.92 length of basal node (Fig. 1H), circumfilum a basal ring with one or two distal extensions; palpus with 5 segments.

*Wing*: length = 3.0–5.6 mm;  $M_{1+2}$  present apically,  $M_3$  present apically; halter with moderately elongate stem (Fig. 2H).

*Genitalia* (Fig. 4D): tergite 9 narrowed posteriorly, slightly bilobed; gonocoxites with single, evenly curved posteromedial concavity bordered laterally by moderately developed lobes; gonostylus with anteroventral dense patch of short setae, with short to very short, rounded to angular, in some

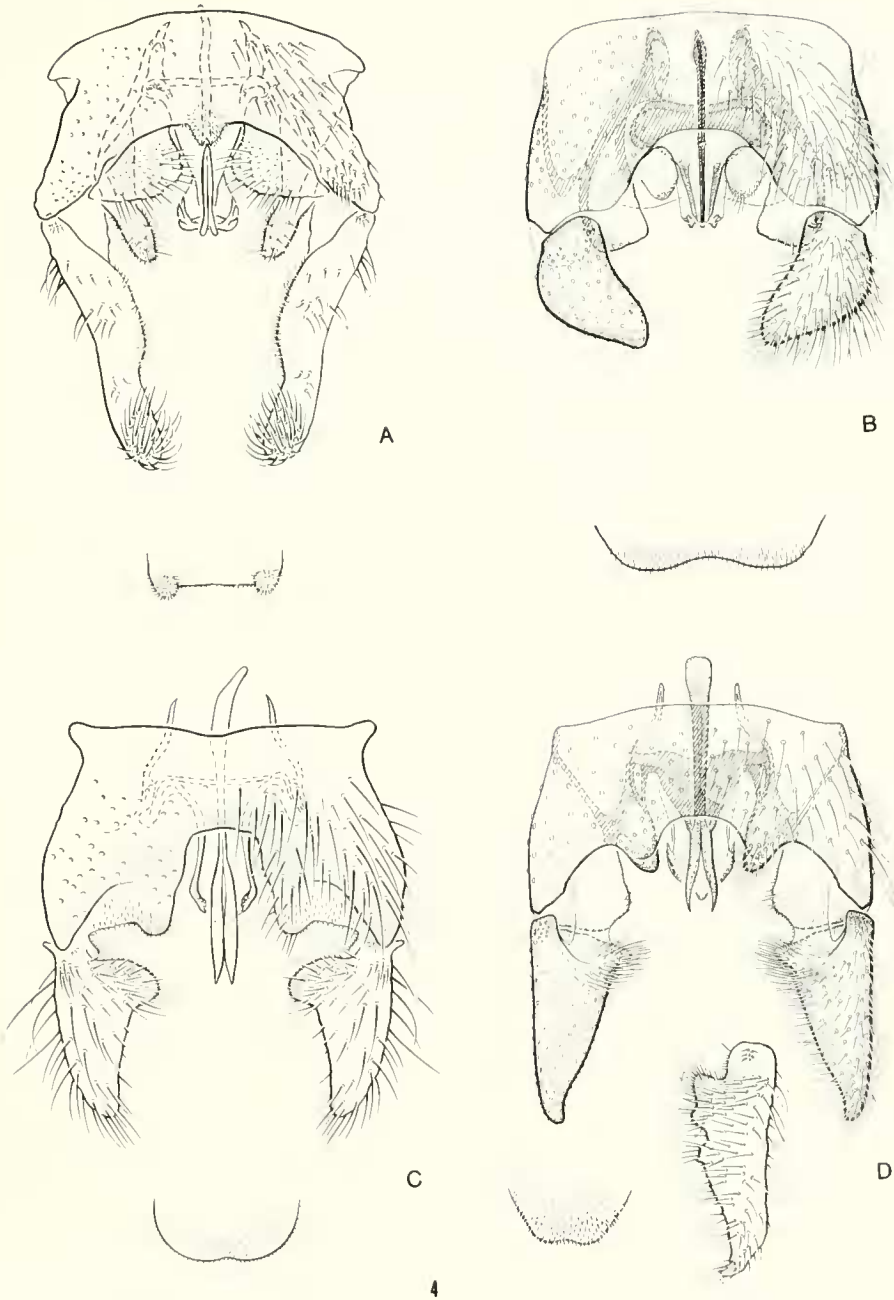


Fig. 4. Male genitalia in ventral view; apex of tergite 9 drawn below. A, *D. elongata*. B, *D. furcata*. C, *D. loba*. D, *D. oregonensis*, with variation in gonostylus shape shown.

poorly defined, densely setose mediobasal lobe, gonostylus tapering gradually to apex, small apical projection slightly bent medially, medial surface of gonostylus smooth to jagged; paramere forming triangular projection posteriorly, posterolateral margins with short, stout barbs, some with subapical margin also with barbs; aedeagus undivided at midlength, biramous apically with ends diverging, a few spicules present or absent.

Taxonomic discussion.—Specimens of *D. oregonensis* were collected by sweeping, with a malaise trap, or at a light.

Of the six specimens examined for this study, some differences were noted in the shape of gonostylus and in the shape and extent of the posterolateral barbs of the parameres. These character states should be re-studied once more material becomes available to test the possibility of the presence of more than one species under this name.

The specimen from the Yukon Territory had palpal segments 4 and 5 fused on one side but completely separate on the other.

Although the type label bears a date of March 13, 1919, Felt (1919) reported the date of collection as October 10, 1918. This later date is more consistent with the other specimens of *D. oregonensis* which were collected late in the season.

*D. oregonensis* is similar to several Palearctic species. However, I consider the following differences to be significant. In *D. xylophila* the gonostylus is relatively longer, in *D. triangularis* the gonostylus is relatively shorter and broader, in *D. iridis* the ends of the biramous aedeagus are divergent from this base, the spicules on the aedeagus are restricted to the very apex, and the medial area of the gonocoxites is a straight line, and in *D. rossica* the apex of the parameres is rounded.

Material examined.—Five specimens, aside from the holotype, were studied: one specimen from each of Falls Church, Virginia (10-IX-1960, W. W. Wirth), km 155, Dempster Highway, Yukon Territory (12-VII-1984, D. M. Wood), 11 km E. Griffith,

Ontario (9-20-IX-1984, B. E. Cooper) and 2 specimens from Salmon Arm, British Columbia (29-VIII-1988, A. Borkent).

Derivation of specific epithet.—The name *oregonensis* refers to the state from which the holotype was collected.

#### ACKNOWLEDGMENTS

I thank Mr. Leo Forster for mounting most of the specimens on microscope slides. His typically excellent preparations were crucial to this study.

Mr. Barry Flahey drew most of the male genitalia for this paper and I appreciate his skills in this area. The genitalia of *D. oregonensis* and *D. furcata* were drawn by Mr. Ralph Idema.

Ms. Barbara Bissett provided help with some library work and labelling.

Dr. V. Spungis kindly compared my drawings of Nearctic *Dicerura* to those Palearctic species in his collection and made comments on their similarities or differences. He also kindly reviewed a manuscript of this revision. I also thank Dr. R. J. Gagné for lending material from the USNM (Washington, D.C.).

Drs. Yves Bousquet and Lubomir Masner made helpful remarks on an early draft of this paper.

Finally I thank Mr. Bruce Cooper (of our Centre) and Mr. Kevin Ferguson (Outdoor Education Center, Alymer, Ontario) for servicing malaise traps which resulted in the capture of some of this material.

#### LITERATURE CITED

- Arnett, R. H. and G. A. Samuelson. 1986. The insect and spider collections of the world. E. J. Brill/Flora and Fauna Pub., Gainesville, Florida, 220 pp.
- Felt, E. P. 1907. Appendix: New species of Cecidomyiidae, pp. 97-165. In his 22nd report of the State Entomologist on injurious and other insects of the State of New York, 1906. N.Y. State Mus. Bull. 110: 39-186.
- . 1908. Appendix D, pp. 286-422. In his 23rd report of the State Entomologist on injurious and other insects of the State of New York, 1907. N.Y. State Mus. Bull. 124: 5-541.

- . 1919. Five non-gall-making midges (Dip., Cecidomyiidae). *Entomol. News* 30: 219–223.
- Gagné, R. J. 1981. Cecidomyiidae (chapter) 16, pp. 257–292. In McAlpine, J. F. et al., eds., *Manual of Nearctic Diptera*. Vol. 1, Research Branch Agriculture Canada Ottawa, Monograph 27, 674 pp.
- Grover, P. 1981. A catalogue of Indian Gall-midges. *Cecidologia Internationale* 2: 63–108.
- Kaltenbach, J. H. 1874. *Die Pflanzenfeinde aus der Klasse der Insekten*. 848 pp., 401 figs. Stuttgart.
- Kieffer, J. J. 1898. *Synopse des Cécidomyies d'Europe et d'Algérie décrites jusqu'à ce jour*. *Bull. Soc. Hist. nat. Metz* 20: 1–63.
- . 1899. Ueber *Dicerura* Kieff. (*Iridomyza* Rbs.). *Wien. Entomol. Ztg.* 18: 165–169.
- Mamaev, B. M. 1960. Description of two new genera and one species of gall midges (Itonididae, Diptera) developing in rotten wood (in Russian, with English summary). *Zool. Zh.* 39: 1521–1524.
- . 1964. Gall-midges of the USSR. 6. New species of the tribe Porricondylini (Diptera, Cecidomyiidae) (in Russian, with English summary). *Entomol. Obozr.* 43: 894–913.
- . 1966. New and little known Palaearctic gall midges of the tribe Porricondylini (Diptera, Cecidomyiidae) (in Russian, with English summary). *Acta Entomol. Bohemoslov.* 63: 213–239.
- . 1968. New nematoceros Diptera of the USSR fauna (Diptera, Axymyiidae, Mycetobiidae, Sciaridae, Cecidomyiidae) (in Russian, with English summary). *Entomol. Obozr.* 47: 605–616.
- . 1972. Review of species and ecological relations of insects-decomposers of wood-matter of *Ulmus propinqua* Loidz. (in Russian). *Tr. biol.-pochv. Inst. Vladivostok (N.S.)* 7: 106–120.
- . 1973. The biology of *Dicerura iridis* Kaltenbach—the new species of gall-midges in the fauna of the USSR (in Russian, with English summary). *Acta Entomol. Lituonica* 2: 177–181.
- . 1975. Comparative character of entomocomplexes developing in wood-matter of *Padus asiatica* in the south Maritime Territory (in Russian). *Tr. biol.-pochv. Inst. Vladivostok (N.S.)* 28: 58–62.
- Mamaev, B. M. and E. P. Krivosheina. 1965. Larvae of gall midges. Diptera, Cecidomyiidae (in Russian). *Akad. Nauk USSR, Moscow*.
- Panelius, S. 1965. A revision of the European gall midges of the subfamily Porricondylinae (Diptera: Itonididae). *Acta Zool. Fenn.* 113: 1–157.
- Parnell, J. R. 1971. A revision of the Nearctic Porricondylinae (Diptera: Cecidomyiidae) based largely on an examination of the Felt types. *Misc. Publ. Entomol. Soc. Am.* 7: 275–348.
- Rübsaamen, E. H. 1899. Ueber Gallmücken auf *Carex* und *Iris*. *Wien. Entomol. Ztg.* 18: 57–76.
- Spungis, V. V. 1979. Eine neue Art der Gallmücken der Gattung *Dicerura* Kieffer aus Lettland. *Latv. Entomol.* 22: 83–87.
- . 1987. Gall midges of the subtribe Dicerurina (Diptera, Cecidomyiidae) in Latvia (in Russian, with English summary). *Latv. Entomol.* 30: 15–42.
- Vockeroth, J. R. 1979. Mycetophilioidea. pp. 390, 404–405. In *Canada and Its Insect Fauna*, H. V. Danks, ed. *Mem. Entomol. Soc. Can.* 108, 573 pp.